

## CLAIMS

1. An electrical variable optical attenuator for attenuating optical signals input from an input optical fiber and output to an output optical fiber comprising:

an attenuating means comprising:

a moveable carrier defining a guide groove; and

a filter fixed on the carrier, the filter having a varying optical density gradient along at least one of its dimensions;

an optical module having a guide pole which is received in the guide groove of the carrier; and

an electrical driving element;

wherein the electrical driving element drives the attenuating means to move along the dimension over which the optical density gradient of the filter varies.

2. The electrical variable optical attenuator as claimed in claim 1, wherein the carrier further defines an insertion slot into which the filter is fixed.

3. The electrical variable optical attenuator as claimed in claim 2, wherein the attenuating means further comprises a sliding patch, and the carrier further defines a slot, and the sliding patch is fixed in the slot.

4. The electrical variable optical attenuator as claimed in claim 3, wherein the sliding patch further comprises a wiper portion.

5. The electrical variable optical attenuator as claimed in claim 4, wherein the electrical driving element comprises a resistor contacting with the wiper portion.

6. The electrical variable optical attenuator as claimed in claim 1, wherein the electrical driving element drives the carrier to move along the guide pole.

7. The electrical variable optical attenuator as claimed in claim 1, wherein the electrical driving element comprises a stepping motor, which drives the carrier to move along the guide pole.
8. The electrical variable optical attenuator as claimed in claim 7, wherein the stepping motor has a screw rod, the carrier further defines an inner screw, and the screw rod engages with the inner screw to drive the carrier along the guide pole.
9. The electrical variable optical attenuator as claimed in claim 1, wherein the optical module further comprises at least one mirror.
10. The electrical variable optical attenuator as claimed in claim 1, further comprising a housing, the electrical driving element and the optical module being mounted in the housing.
11. An electrical variable optical attenuator for attenuating optical signals input from an input optical fiber and output to an output optical fiber comprising:
- a guide pole;
  - at least one mirror for reflecting signals from the input optical fiber to the output optical fiber;
  - a carrier having a guide groove for receiving the guide pole;
  - a filter fixed on the carrier, the filter having a varying optical density gradient along at least one of its dimension; and
  - a stepping motor;
- wherein the stepping motor drives the carrier to move along the guide pole and the filter to move along a direction parallel to the dimension over which the optical density gradient of the filter varies, and optical signals from the input

optical fiber to the output optical fiber pass through the filter.

12. The electrical variable optical attenuator as claimed in claim 11, wherein the carrier further defines an inner screw.

13. The electrical variable optical attenuator as claimed in claim 12, wherein the stepping motor has a screw rod and the screw rod engages with the inner screw, and when the stepping motor rotates the screw rod, the carrier is driven along a direction parallel to an axial direction of the screw rod.

14. The electrical variable optical attenuator as claimed in claim 11, wherein the carrier defines an insertion slot into which the filter is fixed.

15. The electrical variable optical attenuator as claimed in claim 11, further comprising a housing and a cover, and the other components of the electrical variable optical attenuator are contained within the housing.

16. The electrical variable optical attenuator as claimed in claim 11, wherein the at least one mirror is a pair of mirrors positioned so that optical signals emitted from the input optical fiber reflect off one mirror, pass through the filter fixed on the carrier, then reflect off the second mirror and are received by the output optical fiber.

17. An electrical variable optical attenuator assembly comprising:

a linearly moveable carrier with a filter thereon, said filter defining a varying optical density gradient along a moving direction of said carrier;

first and second mirrors symmetrically located by two sides of said filter;

an input optical fiber positioned by one side of said filter and pointing to said first mirror;

an output optical fiber positioned by the other side of said filter and pointing to said second mirror; wherein

light coming from the input optical fiber hits the first mirror and is reflected toward the second mirror and further reflected to penetrate said filter and into the output optical fiber, thus finally leaving therefrom.